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# Remittances and Financial Inclusion

## Evidence from El Salvador

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## Abstract

This paper investigates the impact of remittances on financial inclusion. This is an important issue given recent studies showing that financial inclusion can have significant beneficial effects on households. Using household-level survey data for El Salvador, the authors examine the impact of remittances on households' use of savings and credit instruments from formal financial institutions. They find that although remittances have a positive impact on financial inclusion by promoting the use of deposit accounts, they do not have a significant and robust effect on the demand for and use of credit from formal institutions. If anything, by relaxing credit constraints, remittances might reduce the need for external financing from financial institutions, while at the same time increasing the demand for savings instruments.


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# REMITTANCES AND FINANCIAL INCLUSION:

# EVIDENCE FROM EL SALVADOR

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## I. Introduction

Remittances have become a significant source of external financing for developing countries. They reached US$307 billion in 2009, more than double the amount of official development assistance and over two-thirds of the private capital flows received by developing countries in that year. Remittances are especially significant for small developing countries neighboring large rich economies. For example, remittances account for approximately 17 percent of GDP in the case of El Salvador and they represent the second most important source of external flows after exports.

There is an extensive literature on the effects of remittances on growth, investment in microenterprises, poverty, inequality, health, and education[1]. However, there are not many studies that address the effects of international remittances on the domestic financial system. This question is important because the literature has shown that financial development can have a significant impact on economic growth and poverty reduction (King and Levine, 1993; Beck, Levine, and Loayza, 2000; and Beck, Demirgüç-Kunt, and Levine, 2004).

Furthermore, there is evidence that promoting financial inclusion – facilitating households' access to and use of financial services – can also have significant beneficial effects. Based on a randomized evaluation of a microcredit program in India, Banerjee et al. (2010) find that access to microcredit leads to greater investment in business durables, increases the number of businesses started, and improves the profitability of existing ones. Karlan and Zinman (2010) conduct a field experiment in which a finance company randomly liberalized screening criteria on consumer loans in South Africa and find significant positive effects of access to credit on consumption, economic self-sufficiency (measured by employment status and income), and some

[1] For a thorough review of the literature on the economics of remittances see Rapoport and Docquier (2006). Studies investigating the effects of remittances on growth include: Caceres and Saca (2006), Mundaca (2008), and Giuliano and Ruiz-Arranz (2009). Massey and Parrado (1998), Woodruff and Zenteno (2001 and 2007), Dustmann and Kirchkamp (2002), Mesnard (2004), and Woodruff (2007) examine the impact of remittances on investments in microenterprises. The literature on the effects of remittances on poverty includes: Adams (2004 and 2006), Adams and Page (2005), Taylor et al. (2005), and Acosta et al. (2007). Studies on the impact of remittances on inequality include Adams (1992), Taylor and Wyatt (1996), and McKenzie and Rapoport (2007). Kanaiaupuni and Donato (1999), Hildebrandt and McKenzie (2005), Lopez Cordova (2005), and Amuedo-Dorantes et al. (2007) analyze the effects of remittances on health and mortality, while Cox-Edwards and Ureta (2003), Hanson and Woodruff (2003), Lopez Cordova (2005), Yang (2005), and Acosta et al. (2007) investigate the impact on education.

aspects of mental health and outlook.[2] Studies on the impact of accessing and using savings products also find positive effects. In particular, the literature has found that providing individuals access to savings instruments increases savings (Aportela, 1999, Ashraf et al., 2010[3]), female empowerment (Ashraf, Karlan, and Yin, 2010), productive investment (Dupas and Robinson, 2009), and consumption (Dupas and Robinson, 2009 and Ashraf, Karlan, and Yin, 2010).

Using household-level survey data for El Salvador for the period 1995-2001, this study investigates the impact of remittances on financial inclusion. In particular, we focus on whether remittances promote the use of deposit accounts and credit by examining the impact of remittances on the likelihood that households have a deposit account, apply for loans, and receive loans from formal financial institutions.

There are several ways in which remittances could affect financial inclusion. First, remittances might increase the demand for savings instruments. The fixed costs of sending remittances make the flows lumpy, providing households with excess cash for some period of time. This might potentially increase their demands for deposit accounts, since financial institutions offer households a safe place to store this temporary excess cash. Second, remittances might increase household's likelihood of obtaining a loan. Processing remittances flows provides financial institutions with information on the income of recipient households. This information might make financial institutions better willing and able to extend loans to otherwise opaque borrowers. On the other hand, since remittances might help relax households' financing constraints, the demand for credit might fall as remittances increase.

To the best of our knowledge, there are only three papers that examine the direct link between remittances and the domestic financial system. Aggarwal, Demirgüç-Kunt, and Martínez Pería (2011) study the impact of remittances on the financial sector using balance of payments data on remittances and aggregate data on bank credit and deposit amounts for 109 developing countries over the period 1975-2007. They find strong evidence indicating that

[2] Other studies that find that microcredit increases consumption or income include Pitt and Khandker (1998) and Khandker (2005). However, Roodman and Morduch (2009) are unable to reproduce those results.
[3] Ashraf et al. (2010) show that giving migrants from El Salvador access to bank accounts that allow them to have control over the funds they remit results in an increase in savings.

remittances promote financial development, measured by the ratio bank deposits to GDP, and the share of bank credit to GDP. Gupta et al. (2009) use a similar methodology as Aggarwal et al. and find analogous results for a sample of Sub-Saharan African countries. Focusing exclusively on Mexico and using municipality-level data, Demirgüç-Kunt, Lopez-Cordova, Martínez Pería, and Woodruff (2011) find that municipalities where a higher proportion of households receive remittances have a higher number of bank branches and accounts per capita, and larger shares of deposits to GDP.

Our paper contributes to the study of the impact of remittances on the financial sector in several ways. First, to our knowledge, this is the first paper to analyze the impact of remittances on financial inclusion directly. While previous studies have looked at the link between remittances and aggregate deposits and credit amounts, this is the first study to examine whether remittances foster the use of deposit accounts and credit by households. This is important given the literature that has identified beneficial effects from financial inclusion. Second, by looking at whether households apply for loans, this study is able to examine the impact of remittances on the demand for credit and not purely on credit outcomes. This is useful because it can allow us to begin to assess to what extent remittances might relax credit constraints. Third, by using household-level panel data, this study can circumvent some of the limitations of the previous studies. In particular, the survey data used in this study has the potential to capture remittances flows received through formal and informal channels, minimizing concerns about measurement error in remittances.[4] Also, because we use household-level panel data we are able to control for unobserved household characteristics that can affect both remittances and financial inclusion, something that was not possible in the earlier studies. Finally, our study offers evidence on the impact of remittances on financial inclusion for a new country - El Salvador – for which remittances represent a very significant share of GDP.

We conduct probit estimations of the likelihood of using deposit and credit services, allowing for department-, municipality-, or household-level fixed effects to control for factors other than remittances that might affect financial inclusion at the household level.[5] Also, to deal

[4] This is a significant concern in the study by Aggarwal et al. (2011) that uses balance of payment data on remittances.
[5] El Salvador is divided into 14 departments and 262 municipalities.

with the potential endogeneity of remittances, we conduct instrumental variables regressions. Our main instruments are economic conditions in US states where Salvadoran migrants reside.

Our estimations show that households that receive remittances are more likely to have a deposit account at a financial institution. Our most conservative estimates indicate that receiving remittances increases the likelihood of having an account by at least 11 percent and an additional colon per capita in remittances raises this probability by 5 percent. These effects are sizeable given that on average only 19 percent of households have an account. However, remittance-recipient households are not more prone to request or receive a loan. In fact, some estimations show the opposite. This suggests that though remittances might have the potential to encourage the use of savings instruments, they do not necessarily foster the demand for and use of credit, perhaps because they help to relax credit constraints.

The rest of the paper is organized as follows. Section II characterizes the Salvadoran banking system during our period of study. Section III describes the data and the empirical methodology we employ. Section IV presents the results of our estimations. Section V concludes.

## II. The Salvadoran financial system during the late 1990s

El Salvador's financial system witnessed a number of reforms during the 1990s. In the late 1980s, during the final years of the civil war, the banking system became largely insolvent. Trying to overcome that situation, in 1989, the Salvadoran government adopted a reform plan with the aim of increasing competition and efficiency. In this process, several laws were passed allowing the privatization of banks, removing restrictions on foreign bank entry, and establishing new supervision rules. As a consequence of these reforms and due to good macroeconomic performance, there was a considerable increase in the depth and the size of the financial system (see Fuentes 2001). As shown in Table 1, from 1991 to 2001, the ratio of bank and non-bank credit to the private sector expressed as a share of GDP increased from 23 percent to 39 percent, while the ratio of demand and term deposits to GDP rose from 24 percent to 36 percent. The number of banks and non-bank institutions did not change significantly during the period: there were 14 institutions that were allowed to collect deposits in 2001, only one more than in 1991.

The Salvadoran banking sector became one of the deepest in Central America[6] by the end of the 1990s (see Figure 1). However, despite the financial reforms undertaken during this decade, financial inclusion remained low in El Salvador. Based on a survey of rural households, conducted by FUSADES (Salvadoran Foundation for Economic and Social Development), 8.7 percent of households had a deposit account as of 1995 and 6.8 percent had a loan from a formal financial institution.

## III. Data and empirical methodology

The household-level data we use in this study come from the *National Rural Household Survey* carried out by FUSADES in 1996, 1998, 2000, and 2002. All the information gathered by each survey refers to the previous calendar year. The survey uses a questionnaire adapted from the World Bank's Living Standards Measurement Survey and covers a stratified, nationally representative, random sample of rural households. The four waves contain information for about 937 households dispersed across the 14 departments that make up El Salvador. Within our sample, 719 households are present in more than 1 wave and 451 households have data for the four waves, allowing us to construct a panel.

The survey includes data on demographic characteristics, education, employment, economic activities, wealth, and income of households. With respect to migration, the survey has information on the number of members per household that have migrated to other countries, their kinship relationship or role in the household (i.e. head of household, spouse, son), the time they have been abroad, and the year they came back to El Salvador in case they returned. Moreover, data on whether the individuals that migrated sent remittances and the amount sent are also available.

The survey also contains information on households' use of financial services offered by formal financial institutions (i.e., commercial banks, cooperatives, credit unions, and other financial institutions), development institutions (i.e., NGOs), and informal sources (i.e. stores, friends, employers). In this study, we focus on formal financial institutions in order to analyze the impact of remittances on access to financial services such as loans, savings, and checking

[6] Central America includes the following countries: Guatemala, Honduras, El Salvador, Nicaragua, and Costa Rica.

accounts. Table 1 shows the summary statistics and descriptions of the variables we employ in our analysis.

In order to investigate the impact of remittances on financial inclusion, we estimate the following model:

$$\textit{Financial inclusion}_{it}=\alpha+\beta_1\textit{Remittances}_{it}+\beta_2\textit{Income/Wealth}_{it}+\beta_3\textit{Education}_{it}+$$
$$\beta_4\textit{Returned migrant}_{it}+\beta_5\textit{Other household characteristics}_{it}+\varepsilon_{it} \quad (1)$$

Where *i* denotes households, *t* denotes time. *Financial inclusion* refers to three different alternative dependent dummy variables indicating: (i) whether the household has a deposit account at a formal financial institution; (ii) whether any member of the household has applied for a loan from a financial institution; and (iii) whether the household has received a loan from a financial institution. Considering the whole sample, on average, 19 percent of the households have a deposit account, whereas 7 percent of households asked for a loan from a formal financial institution, and 6 percent received a loan in our sample. Given that our three dependent variables are binary, we conduct probit estimations of equation (1).

*Remittances* refers to either the per capita real amount of remittances that a household received in a given year or a dummy variable indicating whether the household received remittances from abroad. In the survey, information on remittances sent is reported for each member living abroad. For those households with more than one migrant, we compute the total amount of remittances by summing the remittances sent by all the members residing overseas. We then divide this sum by the number of household members to get the per capita data. The remittances dummy variable equals one when the sum of remittances flows to a household is different from zero. On average, 20 percent of households received remittances in our sample and the average per capita real amount of remittances received is 280 colones or 32 dollars (in 1995 prices).

Given that a household's income and wealth could have a direct influence on financial inclusion, a number of variables proxying for the income and wealth of the household are included in the estimations. In particular, *Income/Wealth* represents two different variables: (i) the real income per capita of the household, and (ii) a dummy indicating whether the household

owns its house and land. The household income is computed taking the sum of the amounts that every household member living in El Salvador earns from agricultural and non-agricultural activities, interests, dividends, or pensions. As in the case of remittances, we divide by the number of household members to compute the per capita income. Taking the average across the four surveyed years, the average per capita real income (in 1995 prices) is 2,510 colones or approximately 287 dollars. The percentage of households that own their land and house equals 68 percent.

To allow for the possibility that financially literate households are more likely to use financial services, we include a proxy for financial literacy in our regressions. In particular, *Education* denotes the average number of years of education completed by adult household members. We consider as adult members individuals that are 18 years old or older. Taking the whole sample, the adults' average number of years of education completed is 3.51.

Some migrants might come back to El Salvador after a period. Those migrants might have experience using financial services abroad and, hence, households with a returned migrant might have higher demand for such services. We include *Returned migrant* to control for this possible channel that could potentially affect financial inclusion. The mentioned variable is a dummy that equals one when a household has at least one member that has returned from living abroad. Our sample indicates that 4 percent of the households have at least one member that came back from a foreign country.

Finally, we consider a number of additional household characteristics as controls. In particular, *Other household characteristics* include a dummy for whether members of the household are engaged in agricultural activities (labeled *Agriculture* in our tables) and a dummy variable for whether the household has access to electricity (labeled *Electricity* in our tables). We determine that a household is engaged in agricultural activities when at least one member works in any of those activities in a given year. We expect a positive relationship between *Agriculture* and the probability of holding an account, requesting, or receiving a loan. Households that are engaged in agricultural activities might have more volatile incomes and, hence, have a higher demand for financial services aiming to smooth their income path. *Electricity* provides information on household's wealth, since wealthier households tend to have electric energy, but

it is also used as a proxy for household's proximity to large cities or towns. Households that are closer to big cities are more likely to be near financial institutions.[7] Hence, we expect a positive relationship between electricity and our dependent variables. Based on the complete sample, 65 percent of households have electricity and the percentage of households with at least one member that worked in any agricultural activity equals 87 percent.

We run the three versions of equation 1 considering the likelihood of having an account, applying for a loan, and obtaining a loan as the dependent variables, respectively. We include fixed effects to control for unobserved characteristics that might affect the link between remittances and the use of financial services. In particular, we allow for three different types of fixed effects with decreasing levels of aggregation: (i) department fixed effects, (ii) municipality fixed effects, and (iii) household fixed effects.

An important concern regarding the interpretation of the results of equation 1 is that they could be affected by endogeneity as a result of reverse causation. There are at least two reasons why endogeneity could arise. First, access to financial services from financial institutions might reduce the costs of remittances and, hence, might make migrants more prone to send and households to receive remittances. Second, financial institutions could finance migration, and, consequently, increase the remittance flow towards households with access to credit. We run instrumental variables regressions to deal with the potential endogeneity problem.

Our main instruments are municipality-level weighted average measures of economic conditions in US states where Salvadoran migrants reside.[8] In particular, we focus on real GDP per capita and poverty rates in US states during 1995, 1997, 1999, and 2001.[9] For each municipality in El Salvador, we identify the main US destinations for Salvadoran migrants using data on migration patterns for Salvadorans from the North American Integration and Development Center (NAID).[10] We then construct, for each Salvadoran municipality, a weighted

[7] Our survey measures the distance to the closest bank office, but only for the last two waves: 1999 and 2001. We find that *Electricity* has a negative correlation with the distance to the closest bank (-0.13) and is significant at 1 percent.
[8] We follow McKenzie and Rapoport (2007), who in their study of the impact of migration on income inequality in Mexico, use economic conditions in the US as one of their instruments for migration from Mexico.
[9] Appendix 1 describes other instruments we tried. Our main findings are not affected by our choice of instruments.
[10] The mentioned database is available at http://gis.ats.ucla.edu/naid/. The NAID gathered information on the main destinations in the US of Salvadoran migrants during the last five years. We assume that migration patterns during

average of economic conditions in US states where migrants from that municipality reside by weighing economic conditions in each US state according to the share of migrants from that municipality in El Salvador that reside in each US state. Hence, for every municipality *j* and year *t* the instruments are constructed as follows:

$$Real\ GDP\ per\ capita\ in\ US\ states_{jt} = \sum_{i}^{I} w_{ji}\ \text{RealGDPpc}_{it}$$

$$Poverty\ in\ US\ states_{\ jt} = \sum_{i}^{I} w_{ji}\ \text{Poverty}_{it}$$

where: *i* represents every US state, $RealGDPpc_{it}$ and $Poverty_{it}$ are the real GDP per capita and poverty rates in US state *i* and year *t*, respectively. $w_{ji}$ is the share of migrants from municipality j in El Salvador (out of the total migrants from that municipality) residing in state i in the US. The basic intuition for why we use these variables as instruments is that we think that economic conditions in US states will affect the ability of migrants to send remittances back to their communities in El Salvador, but these variables are unlikely to directly influence the use of financial services by households back in El Salvador.

## IV. Results

Tables 3, 4, and 5 present the estimation results (marginal effects) of the probit regressions for the likelihood of having a deposit account, receiving a loan, and applying for a loan, respectively. Each table shows two sets of estimations: including the remittances dummy variable (columns (1)-(4)) and, separately, the per capita real amount of remittances (column (5)-(8)). For each measure of remittances, we conduct different estimations, depending on whether we include fixed effects and if so at what level of aggregation. The first column of each set does not employ any fixed effects, the second controls for department fixed effects, the third includes municipality fixed effects, and the fourth allows for household fixed effects.

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the last five years are similar to those at the time of our household surveys. In the case of Mexico, Hildebrandt and McKenzie (2005) show that the historic migration rates are a strong predictor of current migration rates.

Table 3 shows the estimation results for the impact of remittances on the likelihood that a household has a deposit account. The results indicate that in all model specifications both the remittances dummy and the amount of remittances per capita are statistically significant and positive. Furthermore, both variables have economically large effects. Receiving remittances increases the probability that the household will have a deposit account by between 11 and 30 percent, depending on the type of fixed effects included. Furthermore, an additional colon per capita in remittances raises the likelihood of having an account by between 5 and 14 percent. These effects are sizeable considering that in the sample 19 percent of households have deposit accounts.

As expected, *Real per capita income* and *House and land ownership* are also significant and positive: more income and wealth make households more prone to having an account. However, *House and land ownership* is not significant in the household fixed effects regressions in columns 4 and 8. *Adults average education* is positive and significant in all cases, whereas *Returned migrant* has the expected positive sign and is significant in all models except the one that controls for household fixed effects. Concerning the variables included in *Other household characteristics, Agriculture* does not seem to be significant, but we do find a significant positive coefficient for *Electricity* in all specifications.

The results for the likelihood of receiving a loan from a formal financial institution are shown in Table 4. In contrast with the results in Table 3, the remittances variables are generally not significant. These results could be driven by the fact that there are potentially two opposing effects of remittances on credit: (1) remittances can be used as an informal type of collateral or as a means to provide information on households' income that might make financial institutions more willing to provide credit; and (2) remittances may help relax households' credit constraints and, hence, could reduce their demand for credit. Thus, these two effects may well be counteracting each other, causing remittances to be generally insignificant.

We find evidence in Table 4 indicating that *Adults average education* has a positive and significant influence on the probability of receiving a loan. This result holds in all model specifications, except the one that includes household fixed effects. We also find some evidence of a positive effect of *House and land ownership*, but this relationship is only significant at 5

percent in the model that employs department fixed effects. *Electricity* shows significant coefficients for the model with department and municipality fixed effects. *Returned migrant* is positive and significant in the household fixed effects estimations.

Table 5 shows that remittances tend to reduce the demand for credit from financial institutions. This is consistent with the notion that remittances might help relax households' credit constrains, lowering their demand for loans. However, the coefficients on the remittances dummy and on the amount of remittances received are only significant in the regressions including municipality fixed effects. *Adults average education* and *Electricity* are significant in all models except the one with household fixed effects. The rest of our independent variables do not seem to be significant in explaining the demand for credit.

As mentioned above, the results in Tables 3, 4 and 5 could be affected by endogeneity as a result of reverse causation. First, the presence of financial institutions may cause higher remittance flows, either because financial inclusion allows people to finance migration, and hence increases migration flows and remittances, or because financial inclusion is associated with lower costs of receiving remittances and, hence, a greater propensity to do so. Neither of these seems to be a first order concern. Financial institutions in El Salvador are an unlikely source of credit to finance migration. While access to financial services might facilitate receipt of remittances, the primary channel appears to be from migration to financial inclusion. We check this by running a regression where we replace the remittance dummy for a dummy which equals one for households with at least a member that is residing overseas. As shown in Table 6, results are nearly identical when we include the dummy for whether the household has a migrant member in place of the dummy for whether it receives remittances. Thus, the effect on the use of deposit accounts appears to be driven by migration, which causes remittance flows.

Nevertheless, to try to assuage concerns about endogeneity, we run instrumental variables regressions. Our main instruments are municipality-level weighted averages of economic conditions in US states where Salvadoran migrants reside. In appendix 1, we also show estimations using migrant characteristics as instruments. In particular, we use information about the length of time that the migrants sending remittances have spent abroad and the closeness of

the relationship of the migrants to the household.[11] However, because these variables are measured at the household level it is easier to think of arguments that can invalidate them as instruments. In particular, there could be a selection effect where the types of households that send migrants for longer periods of time or who send closer relatives abroad may differ in many ways from other households, including differing in financial access. Hence, though Table A.1 and A.2 show that these instruments pass the exclusion restrictions and our main results are confirmed when using these instruments, we prefer to focus on what we think are likely to be more exogenous instruments: economic conditions in US states where Salvadoran migrants reside.

Table 7A and 7B present the results of the first stage estimations where the likelihood of receiving remittances and the amount of remittances received per capita, respectively, are instrumented with the weighted average of real GDP per capita and/or the poverty rate for US states where Salvadoran migrants reside. We use these instruments separately and jointly. Both in Tables 7A and 7B, the size of the Cragg-Donald F-statistics exceed the Stock and Yogo (2005) critical values, indicating that we do not have a weak instruments problem.

We find that GDP per capita in US states has a positive effect on the likelihood that the household receives remittances (Table 7.A columns (1), (4) and (7)) and on the amount of remittances received (Table 7.B columns (1), (4) and (7)) when this variable is included on its own, without the poverty rate. In turn, the poverty rate has a negative impact on the likelihood that the household receives remittances (Table 7.A columns (2), (3), (5), (6), (8) and (9)) and on the amount received (Table 7.B column (2), (3), (5), (6), (8) and (9)), whether it is included on its own or together with GDP per capita.

Table 8A and 8B show the second stage estimations where we instrument the likelihood of receiving remittances and the amount of remittances received per capita, respectively. We use the municipality level weighted GDP per capita for US states where migrants reside and the corresponding poverty rates individually and jointly as instruments. The overidentification tests reported in both tables 8A and 8B suggest that economic conditions in US states where

[11] Following Rodriguez (1996), we expect the length of time spent by migrants abroad to have a non-linear inverted U shape relation to remittances and for remittances to increase with the closeness of the relationship of the migrant to the household.

Salvadoran migrants reside are valid instruments (i.e., we cannot reject exogeneity of the other instrument conditional on one instrument being exogenous).

We find that our main results are robust to controlling for the potential endogeneity of remittances. Namely, while remittances have a positive effect on the likelihood that a household has a deposit account, neither the fact that a household receives remittances nor the actual per capita amount received has a statistically robust impact on the likelihood of applying for and receiving a loan.

## V. Conclusion

As the importance of remittances for developing countries has grown, a sizeable literature has flourished examining the impact of remittances on various aspects of countries' development. An issue which has received little attention is the effect of remittances on the financial system. This issue is important given the evidence that financial development matters for growth and poverty alleviation and financial inclusion has many beneficial effects for households.

This study examined the impact of remittances on financial inclusion using data from a four-wave rural household survey for El Salvador. In particular, we analyzed the impact of remittances on the likelihood that households use financial services such as deposit accounts and loans. Overall, we find that remittances have a positive impact on financial inclusion by promoting the use of deposit accounts. These results hold controlling for unobserved household characteristics and using instrumental variables regressions to correct for the potential endogeneity of remittances. On the other hand, remittances do not have a significant effect on credit from formal financing institutions. Hence, we conjecture that by relaxing credit constraints, remittances might reduce the need for external financing by financial institutions, while at the same time increasing the demand for savings instruments.

There are a number of potential avenues for future research. First, it would be interesting to analyze the extent to which remittance recipients that have accounts, actively use these accounts to save and manage their daily transactions. Second, it would be important to go deeper into the reasons why those that receive remittances do not seem to have a higher demand for credit. In particular, it would be useful to analyze whether indeed this is due to the fact that

remittances relax credit constraints or because the credit products offered to remittance recipients are not considered adequate by this population. We leave these research questions for future work.

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**Table 1: Financial system indicators for El Salvador**

| Year | Credit to private sector to GDP (%) | Demand and term deposits to GDP (%) | Number of institutions |
|---|---|---|---|
| 1991 | 23.4 | 23.8 | 13 |
| 1992 | 27.5 | 25.7 | 13 |
| 1993 | 27.7 | 28.4 | 13 |
| 1994 | 30.9 | 31.1 | 17 |
| 1995 | 34.8 | 29.9 | 21 |
| 1996 | 36.9 | 31.3 | 21 |
| 1997 | 40.3 | 32.6 | 18 |
| 1998 | 41.9 | 33.2 | 17 |
| 1999 | 43.8 | 34.4 | 16 |
| 2000 | 41.4 | 34.0 | 15 |
| 2001 | 39.0 | 36.0 | 14 |

Source: Central Bank of El Salvador and Financial System Superintendency of El Salvador.

**Table 2: Variable description and summary statistics**

| Variable | Description | # Obs. | Mean | Std. dev. |
|---|---|---|---|---|
| Deposit account | Dummy variable. Equals one if the household has a checking or savings account in a bank, cooperative, or other formal financial institution. | 2503 | 0.19 | 0.39 |
| Loan received | Dummy variable. Equals one if the household received a loan from a formal financial institution. | 2708 | 0.06 | 0.25 |
| Loan requested | Dummy variable. Equals one if the household requested a loan from a formal financial institution. | 2717 | 0.07 | 0.26 |
| Remittances dummy | Dummy variable. Equals one if the household received remittances from overseas. | 2741 | 0.20 | 0.40 |
| Remittances amount | Value of remittances per household member in real terms (thousands of colones). | 2683 | 0.28 | 0.83 |
| Real per capita income | Household real per capita income (thousands of colones). | 2572 | 2.51 | 2.52 |
| House and land ownership | Dummy Variable. Equals one if the household owns its house and land. | 2503 | 0.68 | 0.47 |
| Adults average education | Average number of years of education of adults. | 2742 | 3.51 | 2.73 |
| Agriculture | Dummy Variable. Equals one if at least one of the household members worked in any agricultural activity. | 2748 | 0.87 | 0.34 |
| Electricity | Dummy variable. Equals one if the household has electric energy. | 2504 | 0.65 | 0.48 |
| Returned migrant | Dummy variable. Equals one when the household has at least one migrant that has returned from abroad to El Salvador. | 2748 | 0.04 | 0.20 |
| Real GDP per capita in US states | Weighted average of real GDP per capita in US states where Salvadoran migrants reside. For every municipality *j* and year *t* the weighted real GDP per capita is constructed as follows: $\sum_i^I w_{ji} RealGDPpc_{it}$ , where *i* represents US states and $w_{ji}$ is the percentage of migrants from municipality *j* that lives in US state *i*. | 2705 | 34.01 | 2.92 |
| Poverty in US states | Weighted average of the poverty rates in US states where Salvadoran migrants reside. For every municipality *j* and year *t* the weighted poverty rate is constructed as follows: $\sum_i^I w_{ji} Poverty_{it}$, where *i* represents US states and $w_{ji}$ is the percentage of migrants from municipality *j* that lives in US state *i*. | 2705 | 0.13 | 0.01 |

## Table 3. Estimations for the likelihood that the household has a deposit account

This table shows marginal effects from the estimations of a probit model. The dependent variable is 1 if the household has a deposit account with a formal financial institution and zero otherwise. All independent variables are defined in Table 1. In columns (1)-(4), the variable *Remittances* refers to a dummy for whether the household receives remittances from overseas, whereas in columns (5)-(8) *Remittances* refers to per capita amounts received in remittances from overseas. Robust z-statistics are shown in brackets. *,**, and *** denote significance at 10, 5 and 1 percent, respectively.

| | Dependent variable: dummy for whether household has a deposit account | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Variables | Remittance: dummy for whether household receives remittances from overseas | | | | Remittances: the amount of remittances per capita received from overseas | | | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Remittances | 0.109 | 0.126 | 0.143 | 0.291 | 0.047 | 0.049 | 0.060 | 0.136 |
| | [5.33]*** | [5.82]*** | [5.30]*** | [4.64]*** | [6.82]*** | [6.96]*** | [6.66]*** | [4.93]*** |
| Real per capita income | 0.014 | 0.014 | 0.015 | 0.023 | 0.014 | 0.014 | 0.015 | 0.025 |
| | [5.28]*** | [5.15]*** | [4.96]*** | [2.78]*** | [5.27]*** | [5.11]*** | [4.70]*** | [2.86]*** |
| House and land ownership | 0.043 | 0.045 | 0.047 | 0.091 | 0.042 | 0.045 | 0.047 | 0.075 |
| | [2.62]*** | [2.74]*** | [2.42]** | [1.12] | [2.54]** | [2.71]*** | [2.37]** | [0.90] |
| Adults average education | 0.025 | 0.024 | 0.029 | 0.033 | 0.024 | 0.023 | 0.028 | 0.032 |
| | [8.44]*** | [8.09]*** | [7.94]*** | [2.40]** | [8.11]*** | [7.66]*** | [7.64]*** | [2.30]** |
| Agriculture | -0.023 | -0.016 | -0.010 | 0.046 | -0.023 | -0.017 | -0.012 | 0.044 |
| | [-1.02] | [-0.72] | [-0.37] | [0.78] | [-1.02] | [-0.75] | [-0.48] | [0.73] |
| Electricity | 0.106 | 0.108 | 0.127 | 0.306 | 0.103 | 0.105 | 0.123 | 0.295 |
| | [6.13]*** | [6.27]*** | [6.06]*** | [3.92]*** | [5.97]*** | [6.07]*** | [5.82]*** | [3.61]*** |
| Returned migrant | 0.090 | 0.090 | 0.114 | 0.168 | 0.099 | 0.106 | 0.125 | 0.112 |
| | [2.37]** | [2.37]** | [2.40]** | [1.17] | [2.57]** | [2.71]*** | [2.57]** | [0.76] |
| Observations | 2374 | 2374 | 2043 | 795 | 2348 | 2348 | 2004 | 783 |
| Pseudo $R^2$ | 0.15 | 0.16 | 0.21 | 0.14 | 0.16 | 0.17 | 0.22 | 0.15 |
| Log likelihood | -965.2 | -951.6 | -829.7 | -460.3 | -939.9 | -927.6 | -807.6 | -448.7 |
| Department fixed effects | No | Yes | No | No | No | Yes | No | No |
| Municipalities fixed effects | No | No | Yes | No | No | No | Yes | No |
| Household fixed effects | No | No | No | Yes | No | No | No | Yes |

## Table 4. Estimations for the likelihood that the household has a loan from a financial institution.

This table shows marginal effects from the estimations of a probit model. The dependent variable is 1 if the household received a loan from a formal financial institution and zero otherwise. All independent variables are defined in Table 1. In columns (1)-(4), the variable *Remittances* refers to a dummy for whether the household receives remittances from overseas, whereas in columns (5)-(8) *Remittances* refers to per capita amounts received in remittances from overseas. Robust z-statistics are shown in brackets. *,**, and *** denote significance at 10, 5 and 1 percent, respectively.

| | Dependent variable: Dummy for whether household received a loan | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Variables | Remittances: dummy for whether household receives remittances from overseas | | | | Remittances: the amount of remittances per capita received from overseas | | | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Remittances | -0.014 | -0.006 | -0.031 | -0.086 | -0.008 | -0.005 | -0.014 | -0.114 |
| | [-1.13] | [-0.54] | [-1.59] | [-0.82] | [-1.43] | [-1.13] | [-1.65]* | [-1.85]* |
| Real per capita income | 0.001 | 0.001 | 0.002 | -0.020 | 0.001 | 0.001 | 0.002 | -0.017 |
| | [0.58] | [0.71] | [0.67] | [-1.66]* | [0.59] | [0.75] | [0.70] | [-1.29] |
| House and land ownership | 0.020 | 0.021 | 0.031 | 0.019 | 0.020 | 0.022 | 0.032 | 0.015 |
| | [1.85]* | [2.22]** | [1.88]* | [0.20] | [1.88]* | [2.30]** | [1.93]* | [0.15] |
| Adults average education | 0.006 | 0.006 | 0.012 | 0.006 | 0.006 | 0.006 | 0.013 | 0.004 |
| | [3.30]*** | [3.16]*** | [3.71]*** | [0.27] | [3.38]*** | [3.23]*** | [3.92]*** | [0.20] |
| Agriculture | 0.009 | 0.011 | -0.012 | -0.127 | 0.009 | 0.011 | -0.011 | -0.147 |
| | [0.62] | [0.91] | [-0.50] | [-1.12] | [0.63] | [0.89] | [-0.45] | [-1.24] |
| Electricity | 0.017 | 0.019 | 0.034 | -0.062 | 0.018 | 0.020 | 0.035 | -0.057 |
| | [1.56] | [1.95]* | [1.87]* | [-0.60] | [1.60] | [2.00]** | [1.87]* | [-0.55] |
| Returned migrant | 0.013 | 0.026 | 0.028 | 0.704 | 0.017 | 0.031 | 0.036 | 0.747 |
| | [0.54] | [1.07] | [0.67] | [4.64]*** | [0.68] | [1.24] | [0.81] | [9.84]*** |
| Observations | 2347 | 2347 | 1365 | 372 | 2321 | 2321 | 1354 | 362 |
| Pseudo $R^2$ | 0.03 | 0.06 | 0.11 | 0.09 | 0.03 | 0.06 | 0.11 | 0.10 |
| Log likelihood | -545.8 | -528.5 | -421.9 | -225.4 | -543.4 | -526.5 | -419.3 | -217.2 |
| Department fixed effects | No | Yes | No | No | No | Yes | No | No |
| Municipalities fixed effects | No | No | Yes | No | No | No | Yes | No |
| Household fixed effects | No | No | No | Yes | No | No | No | Yes |

## Table 5. Estimations for the likelihood that the household has requested a loan from a financial institution

This table shows marginal effects from the estimations of a probit model. The dependent variable is 1 if the household requested a loan from a formal financial institution and zero otherwise. All independent variables are defined in Table 1. In columns (1)-(4), the variable *Remittances* refers to a dummy for whether the household receives remittances from overseas, whereas in columns (5)-(8) *Remittances* refers to per capita amounts received in remittances from overseas. Robust z-statistics are shown in brackets. *,**, and *** denote significance at 10, 5 and 1 percent, respectively.

| | Dependent variable: Dummy for whether household requested a loan | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Variables | Remittances: dummy for whether household receives remittances from overseas | | | | Remittances: the amount of remittances per capita received from overseas | | | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Remittances | -0.020 | -0.011 | -0.040 | -0.044 | -0.011 | -0.007 | -0.021 | -0.064 |
| | [-1.58] | [-0.85] | [-1.97]** | [-0.45] | [-1.80]* | [-1.42] | [-2.13]** | [-1.52] |
| Real per capita income | 0.001 | 0.002 | 0.002 | -0.019 | 0.002 | 0.002 | 0.002 | -0.017 |
| | [0.80] | [0.92] | [0.56] | [-1.70]* | [0.82] | [0.95] | [0.59] | [-1.43] |
| House and land ownership | 0.018 | 0.019 | 0.028 | -0.028 | 0.018 | 0.020 | 0.028 | -0.033 |
| | [1.61] | [1.88]* | [1.61] | [-0.31] | [1.62] | [1.95]* | [1.63] | [-0.36] |
| Adults average education | 0.006 | 0.006 | 0.011 | 0.019 | 0.006 | 0.006 | 0.012 | 0.020 |
| | [3.12]*** | [2.97]*** | [3.29]*** | [0.97] | [3.22]*** | [3.06]*** | [3.54]*** | [1.01] |
| Agriculture | 0.010 | 0.013 | -0.004 | -0.072 | 0.010 | 0.013 | -0.003 | -0.079 |
| | [0.70] | [1.04] | [-0.16] | [-0.71] | [0.70] | [1.02] | [-0.13] | [-0.75] |
| Electricity | 0.023 | 0.024 | 0.042 | -0.059 | 0.024 | 0.025 | 0.042 | -0.046 |
| | [1.99]** | [2.32]** | [2.23]** | [-0.62] | [2.02]** | [2.37]** | [2.23]** | [-0.49] |
| Returned migrant | 0.019 | 0.032 | 0.038 | 0.258 | 0.022 | 0.037 | 0.046 | 0.399 |
| | [0.72] | [1.24] | [0.85] | [0.91] | [0.84] | [1.39] | [1.02] | [1.21] |
| Observations | 2353 | 2353 | 1423 | 415 | 2327 | 2327 | 1411 | 405 |
| Pseudo $R^2$ | 0.03 | 0.06 | 0.10 | 0.08 | 0.03 | 0.06 | 0.11 | 0.09 |
| Log likelihood | -587.6 | -567.3 | -461.2 | -251.4 | -584.9 | -565.0 | -458.3 | -244.3 |
| Department fixed effects | No | Yes | No | No | No | Yes | No | No |
| Municipalities fixed effects | No | No | Yes | No | No | No | Yes | No |
| Household fixed effects | No | No | No | Yes | No | No | No | Yes |

## Table 6: Estimations for the likelihood of using deposit and credit services replacing remittances with migration

This table shows marginal effects from the estimations of probit models. In columns (1)-(4), the dependent variable is 1 if the household has a deposit account. In columns (5)-(8), the dependent variable is 1 if the household received a loan and in columns (9)-(12) it is one if the household requested a loan and zero otherwise. Migrant refers to a dummy that equals one if the household has at least one member living overseas. All other independent variables are defined in Table 1. Robust z-statistics are shown in brackets. *,**, and *** denote significance at 10, 5 and 1 percent, respectively.

| | Dependent variable: Dummy for whether household has a deposit account | | | | Dependent variable: Dummy for whether household received a loan | | | | Dependent variable: Dummy for whether household requested a loan | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| Migrant | 0.089 | 0.097 | 0.108 | 0.204 | -0.012 | -0.006 | -0.022 | -0.036 | -0.015 | -0.007 | -0.024 | 0.000 |
| | [5.44]*** | [5.86]*** | [5.54]*** | [4.13]*** | [-1.10] | [-0.60] | [-1.35] | [-0.47] | [-1.40] | [-0.74] | [-1.43] | [-0.00] |
| Real per capita income | 0.013 | 0.013 | 0.015 | 0.024 | 0.001 | 0.001 | 0.002 | -0.020 | 0.002 | 0.002 | 0.002 | -0.019 |
| | [5.02]*** | [4.87]*** | [4.76]*** | [2.83]*** | [0.61] | [0.72] | [0.79] | [-1.64] | [0.85] | [0.93] | [0.68] | [-1.70]* |
| House and land ownership | 0.043 | 0.045 | 0.048 | 0.093 | 0.020 | 0.021 | 0.031 | 0.007 | 0.018 | 0.019 | 0.027 | -0.040 |
| | [2.64]*** | [2.76]*** | [2.48]** | [1.16] | [1.85]* | [2.23]** | [1.84]* | [0.07] | [1.58] | [1.87]* | [1.52] | [-0.44] |
| Adults average education | 0.024 | 0.024 | 0.029 | 0.032 | 0.006 | 0.006 | 0.012 | 0.003 | 0.006 | 0.005 | 0.011 | 0.016 |
| | [8.38]*** | [8.05]*** | [7.95]*** | [2.31]** | [3.28]*** | [3.13]*** | [3.68]*** | [0.14] | [3.11]*** | [2.94]*** | [3.28]*** | [0.83] |
| Agriculture | -0.026 | -0.019 | -0.011 | 0.038 | 0.009 | 0.011 | -0.010 | -0.120 | 0.010 | 0.014 | -0.002 | -0.070 |
| | [-1.15] | [-0.86] | [-0.42] | [0.65] | [0.64] | [0.91] | [-0.45] | [-1.05] | [0.72] | [1.06] | [-0.09] | [-0.68] |
| Electricity | 0.109 | 0.111 | 0.133 | 0.321 | 0.017 | 0.019 | 0.033 | -0.062 | 0.022 | 0.023 | 0.040 | -0.058 |
| | [6.39]*** | [6.52]*** | [6.48]*** | [4.26]*** | [1.50] | [1.91]* | [1.82]* | [-0.61] | [1.89]* | [2.24]** | [2.12]** | [-0.62] |
| Returned migrant | 0.088 | 0.092 | 0.109 | 0.182 | 0.011 | 0.025 | 0.025 | 0.703 | 0.016 | 0.030 | 0.032 | 0.240 |
| | [2.36]** | [2.45]** | [2.30]** | [1.30] | [0.47] | [1.04] | [0.59] | [4.31]*** | [0.62] | [1.18] | [0.73] | [0.87] |
| Observations | 2380 | 2380 | 2046 | 796 | 2353 | 2353 | 1366 | 373 | 2359 | 2359 | 1424 | 416 |
| Pseudo $R^2$ | 0.146 | 0.157 | 0.211 | 0.139 | 0.026 | 0.057 | 0.111 | 0.088 | 0.024 | 0.058 | 0.102 | 0.081 |
| Log likelihood | -967.0 | -954.4 | -830.6 | -463.4 | -546.4 | -529.0 | -422.2 | -226.1 | -588.5 | -567.9 | -462.2 | -252.1 |
| Department fixed effects | No | Yes | No | No | No | Yes | No | No | No | Yes | No | No |
| Municipalities fixed effects | No | No | Yes | No | No | No | Yes | No | No | No | Yes | No |
| Household fixed effects | No | No | No | Yes | No | No | No | Yes | No | No | No | Yes |

## Table 7A: First stage estimations instrumenting the likelihood that the household receives remittances

This table shows the results of the first stage regressions instrumenting the likelihood that the household receives remittances. The dependent variable is a dummy for whether the household received remittances. The instruments used are *Real GDP per capita in US states* and *Poverty in US states* defined in Table 1. Columns (1)-(3) are the first stage regressions for the likelihood that the household has a deposit account. Columns (4)-(6) are the first stage regressions for the likelihood of receiving a loan, while columns (7)-(9) show the first stage regressions for the likelihood of applying for a loan. All independent variables are defined in Table 1. Department fixed effects are estimated but not reported. Robust z-statistics are shown in brackets. *,**, and *** denote significance at 10, 5 and 1 percent, respectively.

| Variables | Dependent variable: dummy for whether household receives remittances | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Deposit account | | | Loan received | | | Loan requested | | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| Real GDP per capita in US states | 0.019 | | 0.004 | 0.018 | | 0.003 | 0.019 | | 0.003 |
| | [6.46]*** | | [0.97] | [6.31]*** | | [0.44] | [6.37]*** | | [0.46] |
| Poverty in US states | | -4.445 | -3.716 | | -4.358 | -3.889 | | -4.387 | -3.905 |
| | | [-7.41]*** | [-3.99]*** | | [-7.23]*** | [-3.15]*** | | [-7.28]*** | [-3.21]*** |
| Real per capita income | -0.005 | -0.004 | -0.004 | -0.006 | -0.005 | -0.005 | -0.006 | -0.005 | -0.005 |
| | [-1.44] | [-1.31] | [-1.34] | [-1.65]* | [-1.51] | [-1.53] | [-1.62] | [-1.48] | [-1.50] |
| House and land ownership | 0.069 | 0.067 | 0.067 | 0.070 | 0.068 | 0.069 | 0.069 | 0.068 | 0.068 |
| | [4.47]*** | [4.35]*** | [4.39]*** | [4.54]*** | [4.44]*** | [4.46]*** | [4.49]*** | [4.38]*** | [4.40]*** |
| Adults average education | 0.000 | 0.001 | 0.001 | 0.002 | 0.002 | 0.002 | 0.001 | 0.001 | 0.001 |
| | [0.13] | [0.17] | [0.16] | [0.45] | [0.50] | [0.49] | [0.28] | [0.32] | [0.31] |
| Agriculture | -0.007 | -0.008 | -0.008 | -0.005 | -0.005 | -0.006 | -0.005 | -0.005 | -0.006 |
| | [-0.30] | [-0.32] | [-0.34] | [-0.20] | [-0.23] | [-0.24] | [-0.20] | [-0.23] | [-0.24] |
| Electricity | 0.090 | 0.096 | 0.094 | 0.092 | 0.098 | 0.096 | 0.092 | 0.097 | 0.096 |
| | [5.56]*** | [5.97]*** | [5.80]*** | [5.65]*** | [6.05]*** | [5.90]*** | [5.62]*** | [6.03]*** | [5.88]*** |
| Returned migrant | 0.322 | 0.315 | 0.315 | 0.326 | 0.319 | 0.319 | 0.32 | 0.314 | 0.313 |
| | [6.50]*** | [6.33]*** | [6.34]*** | [6.57]*** | [6.40]*** | [6.40]*** | [6.46]*** | [6.30]*** | [6.31]*** |
| Constant | -0.668 | 0.540 | 0.309 | -0.660 | 0.524 | 0.373 | -0.607 | 0.572 | 0.419 |
| | [-6.5]*** | [6.06]*** | [1.24] | [-6.43]*** | [5.83]*** | [1.05] | [-5.79]*** | [6.07]*** | [1.20] |
| Observations | 2315 | 2315 | 2315 | 2287 | 2287 | 2287 | 2293 | 2293 | 2293 |
| Wald test $chi^2$ | 1353.0 | 1332.0 | 1339.0 | 57.3 | 62.8 | 61.6 | 64.9 | 73.6 | 72.1 |
| Wald test p-value | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Cragg-Donald weak inst. F-stat | 41.42 | 54.48 | 27.48 | 39.46 | 51.76 | 26.12 | 40.27 | 52.51 | 26.52 |

## Table 7B: First stage estimations instrumenting the per capita amount of remittances received

This table shows the results of the first stage regressions instrumenting the per capita amount of remittances received. The dependent variable is the per capita amount of remittances received from overseas. The instruments used are *Real GDP per capita in US states* and *Poverty in US states*. Columns (1)-(3) are the first stage regressions for likelihood that the household has a deposit account. Columns (4)-(6) are the first stage regressions for the likelihood of receiving a loan, while columns (7)-(9) show the first stage regressions for the likelihood of applying for a loan. All independent variables are defined in Table 1. Department fixed effects are estimated but not reported. Robust z-statistics are shown in brackets. *,**, and *** denote significance at 10, 5 and 1 percent, respectively.

| Variables | Dependent variable: per capita amount of remittances | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Deposit account | | | Loan received | | | Loan requested | | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| Real GDP per capita in US states | 0.036 | | 0.009 | 0.036 | | 0.006 | 0.036 | | 0.005 |
| | [4.31]*** | | [0.87] | [4.21]*** | | [0.32] | [4.23]*** | | [0.31] |
| Poverty in US states | | -8.509 | -6.965 | | -8.394 | -7.389 | | -8.387 | -7.444 |
| | | [-5.43]*** | [-3.30]*** | | [-5.31]*** | [-2.27]** | | [-5.32]*** | [-2.36]** |
| Real per capita income | -0.008 | -0.007 | -0.007 | -0.009 | -0.008 | -0.008 | -0.009 | -0.008 | -0.008 |
| | [-0.84] | [-0.75] | [-0.77] | [-0.95] | [-0.86] | [-0.88] | [-0.95] | [-0.86] | [-0.88] |
| House and land ownership | 0.115 | 0.111 | 0.112 | 0.116 | 0.112 | 0.113 | 0.117 | 0.113 | 0.114 |
| | [2.86]*** | [2.76]*** | [2.78]*** | [2.87]*** | [2.78]*** | [2.80]*** | [2.90]*** | [2.81]*** | [2.83]*** |
| Adults average education | 0.010 | 0.011 | 0.011 | 0.013 | 0.013 | 0.013 | 0.011 | 0.011 | 0.011 |
| | [1.11] | [1.14] | [1.13] | [1.33] | [1.37] | [1.36] | [1.19] | [1.22] | [1.22] |
| Agriculture | -0.006 | -0.007 | -0.008 | -0.004 | -0.005 | -0.006 | -0.003 | -0.005 | -0.005 |
| | [-0.10] | [-0.12] | [-0.13] | [-0.07] | [-0.09] | [-0.10] | [-0.06] | [-0.08] | [-0.09] |
| Electricity | 0.234 | 0.245 | 0.241 | 0.234 | 0.245 | 0.242 | 0.236 | 0.247 | 0.244 |
| | [5.74]*** | [6.11]*** | [5.93]*** | [5.68]*** | [6.06]*** | [5.77]*** | [5.74]*** | [6.12]*** | [5.84]*** |
| Returned migrant | 0.668 | 0.657 | 0.656 | 0.678 | 0.667 | 0.667 | 0.665 | 0.654 | 0.654 |
| | [4.02]*** | [3.99]*** | [3.98]*** | [4.05]*** | [4.02]*** | [4.01]*** | [4.01]*** | [3.97]*** | [3.97]*** |
| Constant | -1.363 | 0.968 | 0.477 | -1.321 | 0.949 | 0.627 | -1.353 | 0.946 | 0.641 |
| | [-4.6]*** | [4.11]*** | [0.83] | [-4.31]*** | [4.22]*** | [0.63] | [-4.53]*** | [3.99]*** | [0.66] |
| Observations | 2289 | 2289 | 2289 | 2261 | 2261 | 2261 | 2267 | 2267 | 2267 |
| Wald test $chi^2$ | 574.5 | 573.9 | 573.8 | 57.9 | 64.9 | 62.6 | 64.3 | 78.6 | 75.7 |
| Wald test p-value | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Cragg-Donald weak inst. F-stat | 18.42 | 29.21 | 14.69 | 17.61 | 28.00 | 14.08 | 17.75 | 28.09 | 14.12 |

## Table 8A. Second stage regressions instrumenting the likelihood that the household receives remittances

This table shows marginal effects from the estimations of a probit using instrumental variables. The variable being instrumented is the dummy for whether households receive remittances. The instruments used are *Real GDP per capita in US states* (columns (1), (3), (4), (6), (7), and (9)) and *Poverty in US states* (columns (2), (3), (5), (6), (8), and (9)). The dependent variables are dummy variables for whether the household has a deposit account (columns (1)-(3)), received a loan (columns (4)-(6)) and requested a loan (columns (7)-(9)). All independent variables and instruments are defined in Table 1. Department fixed effects are estimated but not reported. Robust z-statistics are shown in brackets. *,**, and *** denote significance at 10, 5 and 1 percent, respectively.

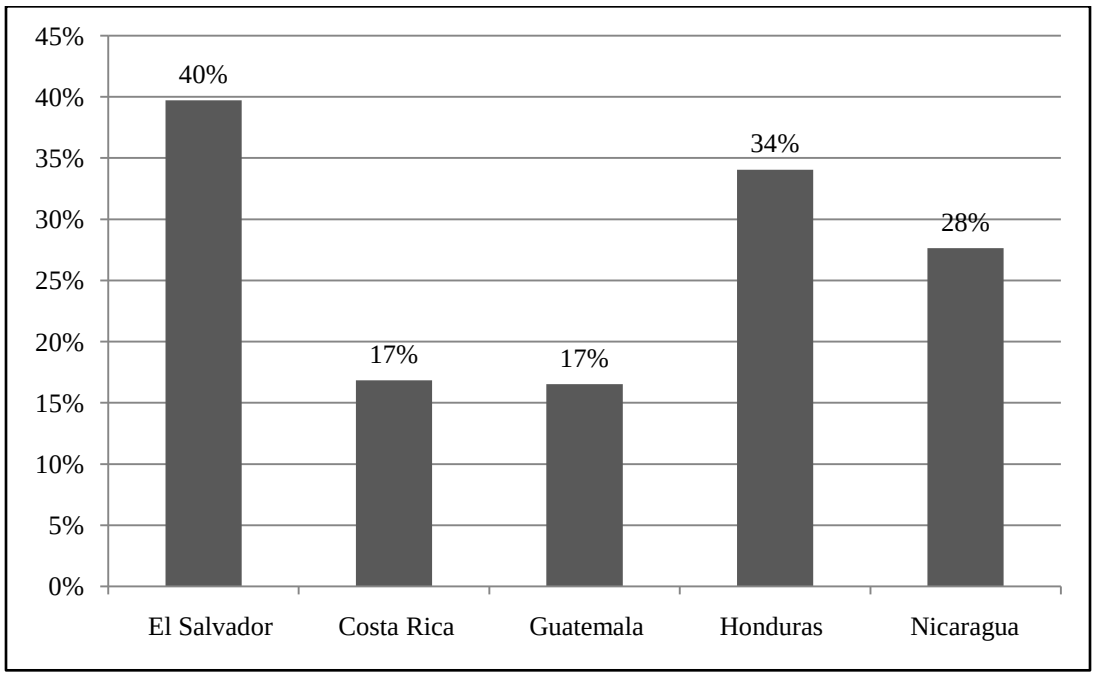
| Variables | Deposit account | | | Loan received | | | Loan requested | | |
|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| Remittances | 0.779 | 0.778 | 0.778 | 0.003 | -0.053 | -0.048 | -0.030 | -0.072 | -0.068 |
| | [38.88]*** | [38.47]*** | [39.18]*** | [0.03] | [-1.01] | [-0.85] | [-0.40] | [-1.34] | [-1.20] |
| Real per capita income | 0.015 | 0.015 | 0.015 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 |
| | [4.33]*** | [4.37]*** | [4.36]*** | [0.62] | [0.41] | [0.44] | [0.75] | [0.58] | [0.60] |
| House and land ownership | -0.004 | -0.004 | -0.004 | 0.020 | 0.025 | 0.025 | 0.020 | 0.025 | 0.024 |
| | [-0.20] | [-0.17] | [-0.17] | [1.86]* | [2.03]** | [1.98]** | [1.64] | [1.83]* | [1.79]* |
| Adults average education | 0.020 | 0.021 | 0.021 | 0.006 | 0.006 | 0.006 | 0.006 | 0.006 | 0.006 |
| | [4.93]*** | [5.12]*** | [5.12]*** | [3.09]*** | [2.96]*** | [2.97]*** | [2.87]*** | [2.77]*** | [2.78]*** |
| Agriculture | -0.015 | -0.015 | -0.015 | 0.012 | 0.013 | 0.013 | 0.015 | 0.016 | 0.015 |
| | [-0.57] | [-0.57] | [-0.56] | [1.07] | [1.05] | [1.05] | [1.20] | [1.18] | [1.18] |
| Electricity | 0.026 | 0.028 | 0.028 | 0.019 | 0.027 | 0.026 | 0.027 | 0.035 | 0.034 |
| | [0.95] | [1.08] | [1.08] | [1.42] | [1.87]* | [1.78]* | [1.87]* | [2.20]** | [2.14]** |
| Returned migrant | -0.142 | -0.139 | -0.139 | 0.024 | 0.063 | 0.058 | 0.046 | 0.083 | 0.079 |
| | [-3.25]*** | [-3.30]*** | [-3.32]*** | [0.46] | [0.97] | [0.90] | [0.73] | [1.15] | [1.08] |
| Instrument: Real GDP per capita in US states | Yes | No | Yes | Yes | No | Yes | Yes | No | Yes |
| Instrument: Poverty in US states | No | Yes | Yes | No | Yes | Yes | No | Yes | Yes |
| Observations | 2315 | 2315 | 2315 | 2287 | 2287 | 2287 | 2293 | 2293 | 2293 |
| Wald test $chi^2$ | 1353.0 | 1332.0 | 1339.0 | 57.3 | 62.8 | 61.6 | 64.9 | 73.6 | 72.1 |
| Wald test p-value | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Log likelihood | -1866 | -1857 | -1857 | -1452 | -1447 | -1447 | -1498 | -1492 | -1492 |
| Over-identification test $chi^2$ | - | - | 0.04 | - | - | 2.08 | - | - | 1.59 |
| Over-identification test p-value | - | - | 0.85 | - | - | 0.15 | - | - | 0.21 |

## Table 8B. Second stage estimations instrumenting the per capita amount of remittances received

This table shows marginal effects from the estimations of a probit using instrumental variables. The dependent variables are dummy variables for whether the household has a deposit account (columns (1)-(3)), received a loan (columns (4)-(6)) and requested a loan (columns (7)-(9)). The variable being instrumented is the per capita amount of remittances received by households. The instruments used are *Real GDP per capita in US states* (columns (1), (3), (4), (6), (7), and (9)) and *Poverty in US states* (columns (2), (3), (5), (6), (8), and (9)). All independent variables and instruments are defined in Table 1. Department fixed effects are estimated but not reported. Robust z-statistics are shown in brackets. *,**, and *** denote significance at 10, 5 and 1 percent, respectively.

| Variables | Deposit account | | | Loan received | | | Loan requested | | |
|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| Remittances | 0.361 | 0.360 | 0.360 | 0.005 | -0.035 | -0.030 | -0.014 | -0.052 | -0.047 |
| | [9.16]*** | [10.30]*** | [10.24]*** | [0.10] | [-0.72] | [-0.56] | [-0.28] | [-0.93] | [-0.80] |
| Real per capita income | 0.013 | 0.013 | 0.013 | 0.001 | 0.001 | 0.001 | 0.002 | 0.001 | 0.001 |
| | [3.36]*** | [3.38]*** | [3.38]*** | [0.67] | [0.50] | [0.53] | [0.82] | [0.66] | [0.68] |
| House and land ownership | 0.001 | 0.001 | 0.001 | 0.021 | 0.025 | 0.025 | 0.020 | 0.025 | 0.024 |
| | [0.05] | [0.04] | [0.05] | [2.03]** | [1.97]** | [1.90]* | [1.69]* | [1.75]* | [1.69]* |
| Adults average education | 0.014 | 0.014 | 0.014 | 0.006 | 0.007 | 0.006 | 0.006 | 0.007 | 0.007 |
| | [2.76]*** | [2.90]*** | [2.91]*** | [3.10]*** | [2.70]*** | [2.67]*** | [2.82]*** | [2.58]*** | [2.54]** |
| Agriculture | -0.016 | -0.016 | -0.016 | 0.012 | 0.013 | 0.013 | 0.015 | 0.016 | 0.016 |
| | [-0.64] | [-0.63] | [-0.63] | [1.03] | [1.03] | [1.03] | [1.17] | [1.15] | [1.15] |
| Electricity | 0.000 | 0.001 | 0.001 | 0.018 | 0.029 | 0.027 | 0.028 | 0.039 | 0.037 |
| | [0.00] | [0.03] | [0.04] | [1.24] | [1.64] | [1.49] | [1.64] | [1.90]* | [1.76]* |
| Returned migrant | -0.137 | -0.137 | -0.136 | 0.023 | 0.067 | 0.061 | 0.046 | 0.090 | 0.084 |
| | [-2.58]*** | [-2.75]*** | [-2.73]*** | [0.43] | [0.94] | [0.82] | [0.69] | [1.11] | [1.00] |
| Instrument: Real GDP per capita in US states | Yes | No | Yes | Yes | No | Yes | Yes | No | Yes |
| Instrument: Poverty in US states | No | Yes | Yes | No | Yes | Yes | No | Yes | Yes |
| Observations | 2289 | 2289 | 2289 | 2261 | 2261 | 2261 | 2267 | 2267 | 2267 |
| Wald test $chi^2$ | 574.5 | 573.9 | 573.8 | 57.9 | 64.9 | 62.6 | 64.3 | 78.6 | 75.7 |
| Wald test p-value | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Log likelihood | -4005 | -3999 | -3999 | -3596 | -3593 | -3593 | -3645 | -3642 | -3642 |
| Over-identification test $chi^2$ | - | - | 0.01 | - | - | 2.21 | - | - | 1.70 |
| Over-identification test p-value | - | - | 0.94 | - | - | 0.14 | - | - | 0.19 |

**Figure 1: Private credit to GDP in Central America (average 1995-2001)**




Source: Central American Executive Secretariat of the Monetary Council and Central Bank of El Salvador.

**Appendix 1: Instrumental variable estimations using migrants' characteristics**

We employ three different variables related to migrants' characteristics as alternative instruments for remittances: *Average time abroad*, *Average time abroad*$^2$ and *Kinship relationship*. The variable *Average time abroad* denotes the average time spent abroad by the household members who migrated. For each member of the household residing abroad, the survey details the time spent in a foreign country. We take the average time across all members overseas for those households with more than one person living in a foreign country. Following the results of Rodriguez (1996) and Aggarwal and Horowitz (2002), we expect a positive influence of time abroad on remittances. The rationale is that migrants might take some time to settle in the host country before they start sending remittances. However, as Rodriguez (1996) asserts, the flow of remittances could decrease due to long absences. Hence, we expect an inverted U relationship between *Average time abroad* and both the amount of remittances and the likelihood of receiving remittances. Hence, we include *Average time abroad*$^2$ – the square of *Average time abroad* - to allow for this possibility [12]

*Kinship relationship* is an index that measures how close the kinship relationship between the migrants and the household is. The mentioned index equals 2 if at least one of the migrants is a member of the nuclear family (i.e., head of household, spouse or son); equals 1 when the household has relatives living abroad, but none of them are members of the nuclear family; and equals 0 when the household does not have any member living abroad. Based on the results of Rodriguez (1996), we expect the chances of receiving remittances to be higher if the migrants are members of the nuclear family.

Table A1 presents the results of the first stage regressions using as instruments *Average time abroad*, *Average time abroad*$^2$ and *Kinship relationship*. These variables are significant and have the expected signs: *Average time abroad* shows an inverted U relationship with remittances, and *Kinship relationship* has a positive coefficient. In order to test the relevance of our

[12] Rodriguez (1996) analyzes the determinants of remittances flows to Philippines using a survey of overseas workers carried out in 1991. He finds an inverted U relationship between the time spent away and: (i) the decision to remit, and (ii) the remittance amounts. He also shows that remittances tend to be higher when the migrant is part of the nuclear family. Aggarwal and Horowitz (2002) investigate the migrants' motivations to remit using data from Guyana for 1992 and 1993. They find that households that spent more than one year abroad are more prone to send remittances.

instruments, we present the results of the Cragg-Donald weak instruments test. The tests show that the null hypothesis that the proposed instruments are redundant is rejected in all cases.

The second stage regressions are shown in Table A2. In this table, we also test for the validity of instruments using the Amemiya-Lee-Newey over-identification test. The null hypothesis of no-correlation between the instruments and the error term is accepted in all estimations. Hence, these results suggest that we are employing suitable instruments.

The instrumental variables results using migrant characteristics confirm what we found in the previous estimations: remittances have a positive and significant effect on the probability of having a savings or checking account. However, the impact on the likelihood of having or asking for a loan is not significant as before.

## Table A.1. First stage instrumental variables regressions using migrants' characteristics

This table shows the results of the first stage regressions of the instrumental variables estimations using migrants' characteristics as instruments. The instruments used are *Average time abroad, Average time abroad*$^2$, and *Kinship relationship*. In columns (1)-(3), the dependent variable is a dummy for whether the household received remittances. In columns (4)-(6), the dependent variable is the per capita amount of remittances received from overseas. Columns (1) and (4) are the first stage estimations for the likelihood that the household has a deposit account. Columns (2) and (5) are the first stage regressions for the likelihood of receiving a loan, while columns (3) and (6) shows the first stage estimations for the likelihood of applying for a loan. Department fixed effects are estimated but not reported. Robust z-statistics are shown in brackets. *,**, and *** denote significance at 10, 5 and 1 percent, respectively.

| Variables | Deposit account | Loan received | Loan requested | Deposit account | Loan received | Loan requested |
|---|---|---|---|---|---|---|
| | Dependent variable: dummy equal 1 if household receives remittances | | | Dependent Variable: per capita amount of remittances received | | |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Average time abroad | 0.035 | 0.034 | 0.034 | 0.066 | 0.069 | 0.066 |
| | [3.27]*** | [3.15]*** | [3.21]*** | [2.16]** | [2.24]** | [2.14]** |
| Average time abroad $^2$ | -0.002 | -0.002 | -0.002 | -0.004 | -0.004 | -0.004 |
| | [-2.93]*** | [-2.84]*** | [-2.88]*** | [-2.21]** | [-2.34]** | [-2.20]** |
| Kinship relationship | 0.367 | 0.368 | 0.367 | 0.691 | 0.688 | 0.693 |
| | [19.08]*** | [18.91]*** | [18.94]*** | [10.73]*** | [10.58]*** | [10.66]*** |
| Real per capita income | -0.003 | -0.004 | -0.004 | -0.004 | -0.004 | -0.004 |
| | [-1.50] | [-1.60] | [-1.57] | [-0.47] | [-0.48] | [-0.50] |
| House and land ownership | 0.019 | 0.020 | 0.019 | 0.033 | 0.034 | 0.035 |
| | [1.85]* | [1.93]* | [1.88]* | [0.95] | [0.95] | [1.00] |
| Adults average education | 0.001 | 0.001 | 0.001 | 0.011 | 0.012 | 0.011 |
| | [0.24] | [0.42] | [0.32] | [1.36] | [1.45] | [1.37] |
| Agriculture | -0.012 | -0.009 | -0.010 | -0.008 | -0.006 | -0.006 |
| | [-0.84] | [-0.68] | [-0.71] | [-0.17] | [-0.13] | [-0.13] |
| Electricity | 0.024 | 0.025 | 0.024 | 0.130 | 0.127 | 0.129 |
| | [2.10]** | [2.16]** | [2.11]** | [3.65]*** | [3.54]*** | [3.60]*** |
| Returned migrant | 0.237 | 0.240 | 0.237 | 0.542 | 0.550 | 0.541 |
| | [5.11]*** | [5.15]*** | [5.12]*** | [3.38]*** | [3.39]*** | [3.37]*** |
| Constant | -0.018 | -0.004 | 0.005 | -0.136 | -0.193 | -0.139 |
| | [-0.76] | [-0.13] | [0.19] | [-1.53] | [-2.22]** | [-1.55] |
| Observations | 2122 | 2097 | 2103 | 2098 | 2073 | 2079 |
| $R^2$ | 0.706 | 0.705 | 0.705 | 0.398 | 0.397 | 0.397 |
| Cragg-Donald F-stat | 678.9 | 662.6 | 668.9 | 113.7 | 111.9 | 112.9 |

## Table A.2. Second stage instrumental variables regressions using migrants' characteristics

This table shows marginal effects from the estimations of a probit using instrumental variables. The instruments used are *Average time abroad, Average time abroad* $^2$ and *Kinship relationship.* The dependent variables are dummy variables for whether the household has a deposit account (columns (1) and (4)), received a loan (columns (2) and (5)) and requested a loan (columns (3) and (6)). In columns (1)-(3), the variable *Remittances* refers to a dummy for whether the household receives remittances from overseas, whereas in columns (4)-(6) *Remittances* refers to per capita amounts received in remittances from overseas. Department fixed effects are estimated but not reported. Robust z-statistics are shown in brackets. *,**, and *** denote significance at 10, 5 and 1 percent, respectively.

| Variables | Remittances: dummy for whether household receives remittances | | | Remittances: per capita amount of remittances | | |
|---|---|---|---|---|---|---|
| | Deposit account | Loan received | Loan requested | Deposit | Loan received | Loan requested |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Remittances | 0.197 | -0.015 | -0.021 | 0.084 | -0.007 | -0.011 |
| | [5.92]*** | [-1.10] | [-1.50] | [6.27]*** | [-0.79] | [-1.17] |
| Real per capita income | 0.013 | 0.000 | 0.000 | 0.013 | 0.000 | 0.000 |
| | [4.48]*** | [-0.22] | [0.15] | [4.48]*** | [-0.19] | [0.17] |
| House and land ownership | 0.035 | 0.022 | 0.019 | 0.033 | 0.022 | 0.020 |
| | [2.08]** | [2.32]** | [1.87]* | [1.95]* | [2.34]** | [1.91]* |
| Adults average education | 0.022 | 0.006 | 0.006 | 0.021 | 0.007 | 0.006 |
| | [7.12]*** | [3.40]*** | [3.07]*** | [6.57]*** | [3.49]*** | [3.18]*** |
| Agriculture | -0.026 | 0.008 | 0.010 | -0.027 | 0.007 | 0.009 |
| | [-1.05] | [0.63] | [0.74] | [-1.09] | [0.57] | [0.68] |
| Electricity | 0.099 | 0.015 | 0.021 | 0.092 | 0.016 | 0.021 |
| | [5.95]*** | [1.50] | [1.93]* | [5.42]*** | [1.50] | [1.96]** |
| Returned migrant | 0.073 | 0.034 | 0.042 | 0.078 | 0.037 | 0.046 |
| | [1.69]* | [1.11] | [1.26] | [1.79]* | [1.13] | [1.28] |
| Observations | 2122 | 2097 | 2103 | 2098 | 2073 | 2079 |
| Wald test chi$^2$ | 288.4 | 53.53 | 59.03 | 289 | 53.08 | 58.42 |
| Wald test p-value | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Log likelihood | -655.8 | -284.4 | -322.1 | -3291 | -2910 | -2954 |
| Over-identification test chi$^2$ | 0.79 | 1.66 | 1.90 | 0.58 | 1.64 | 1.89 |
| Over-identification test p-value | 0.67 | 0.44 | 0.39 | 0.75 | 0.44 | 0.39 |